

Billings PCE

Introductions



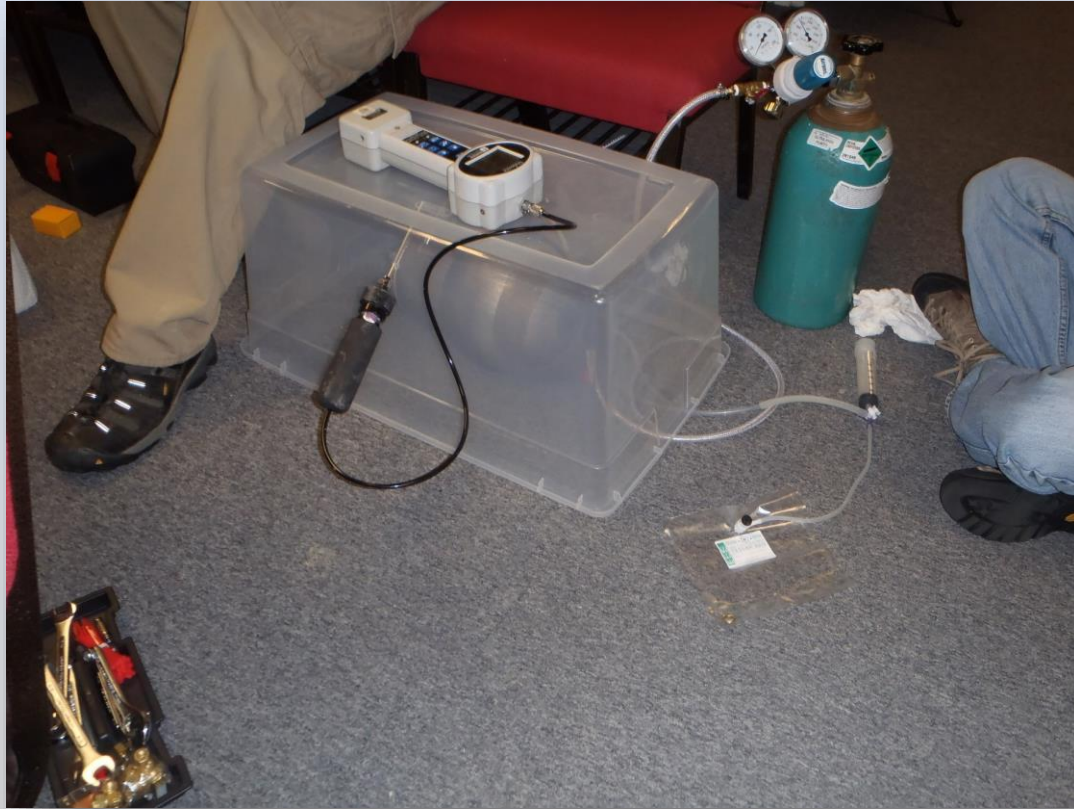
Meeting Guidelines

- Please silence cell phones.
- Be respectful and let others be heard.
- Speak into the microphone and state your name.
- Please speak only on behalf of yourself and respect one another's privacy.
- Please leave the room if you need to have a side conversation. Please hold your questions until the question-and-answer session after the presentations.
- Please limit your questions to two so everyone has an opportunity.

Why Are We Here?

- ☐ To share Remedial Investigation results
- ☐ To talk about potential risks and screening levels
- ☐ To talk about next steps
- ☐ To answer questions

Billings PCE Groundwater Remedial Investigation

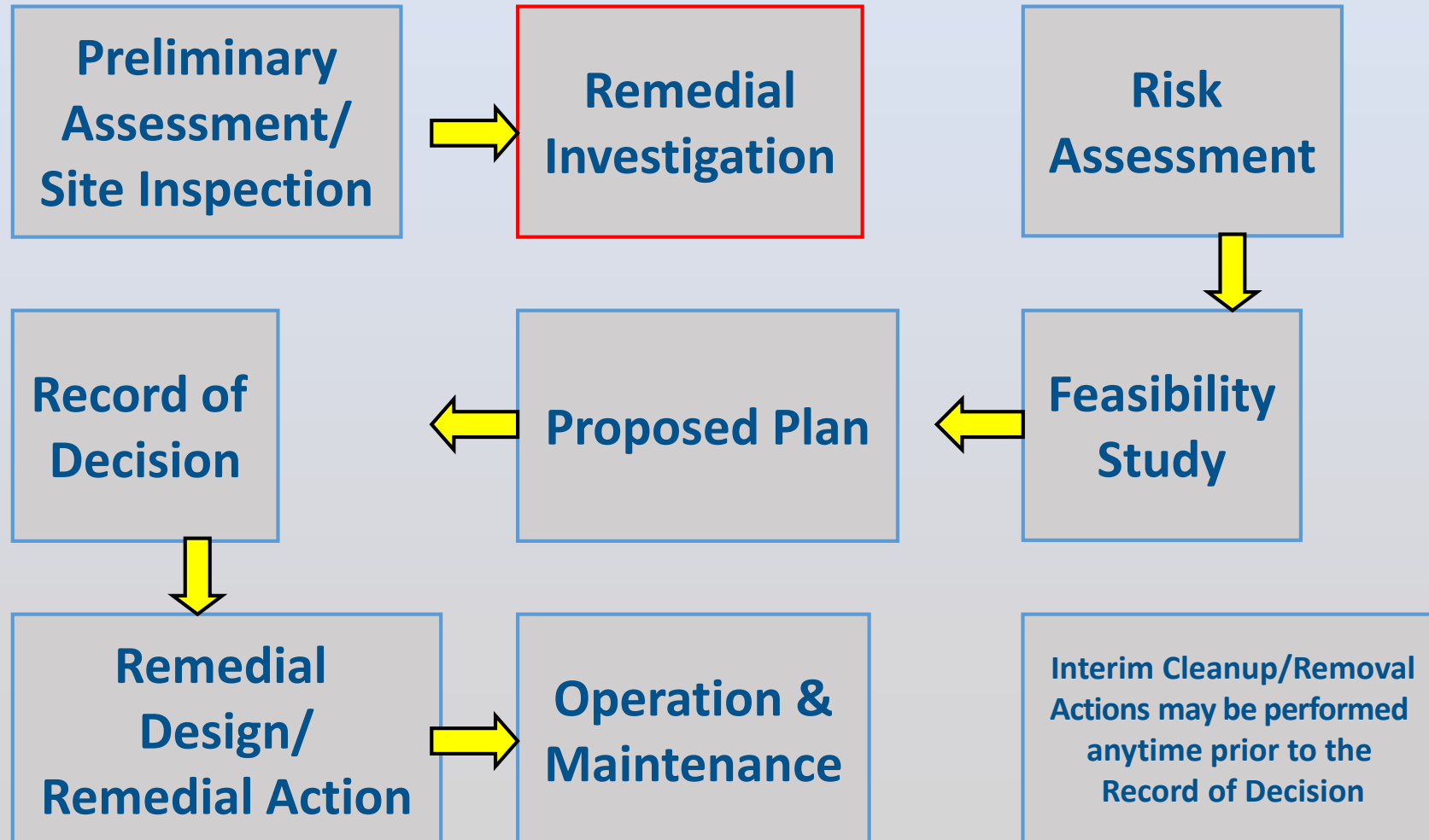


Mike Gipson, Project Officer, Montana Department of Environmental Quality
July 25, 2019

CECRA-State Superfund



CECRA Process Flow Chart

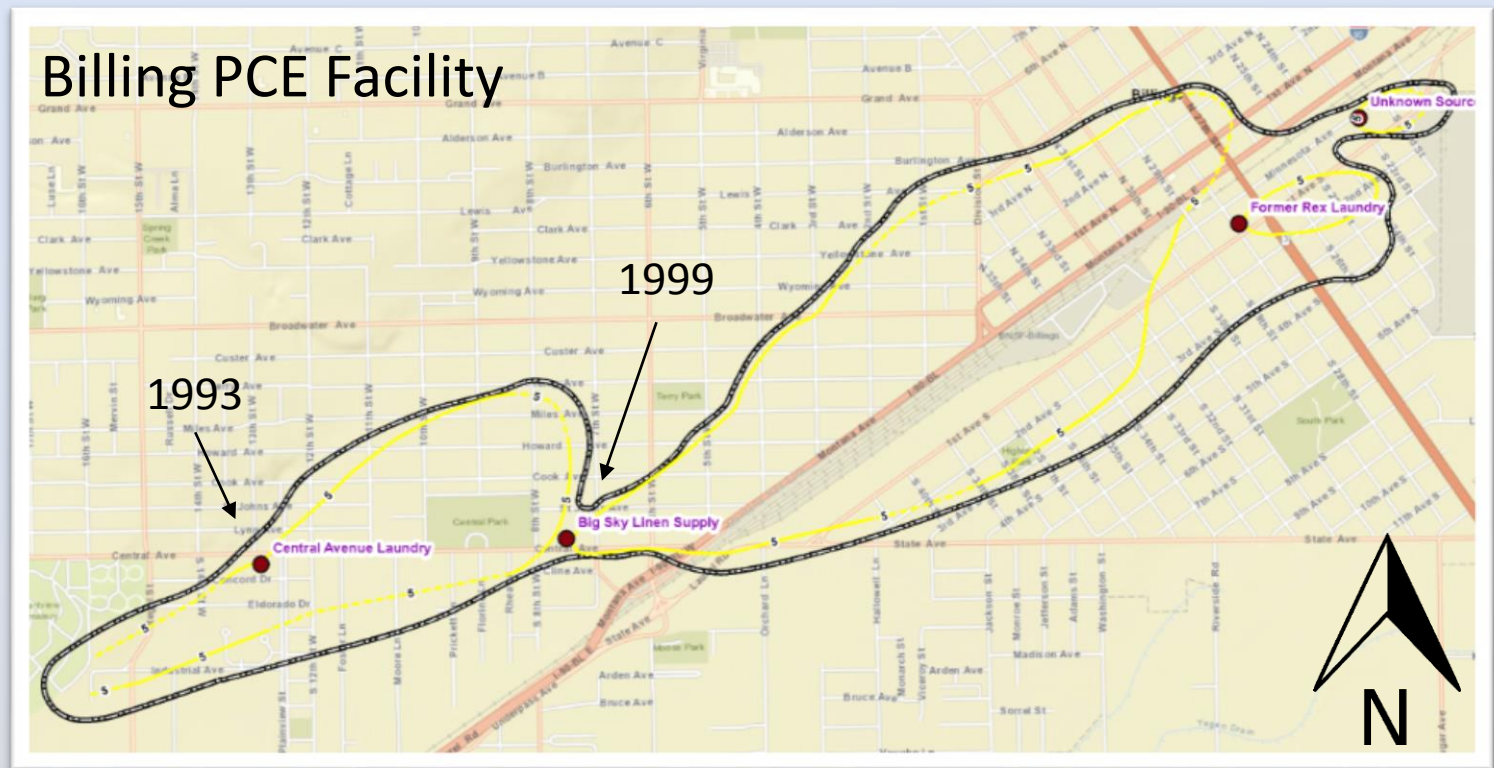


Site Background

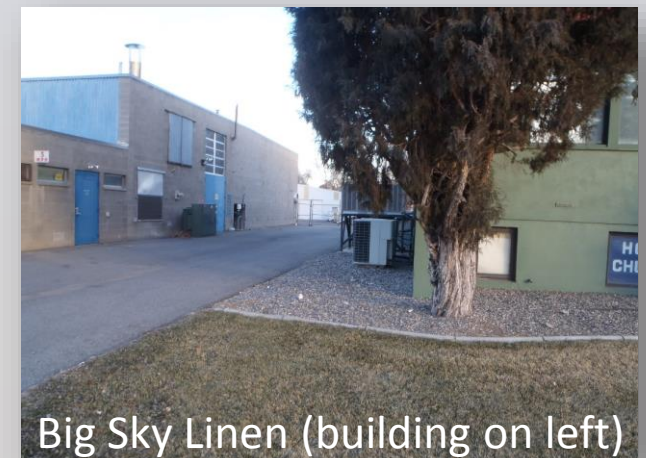
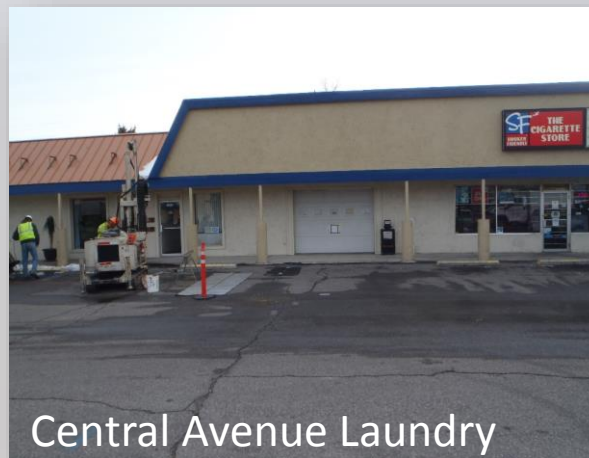
□ 1991-1993: Discovery and preliminary CERCLA Investigation.

- Central Avenue Laundry discovered first
- Big Sky Linen discovered second

□ 1999-2002: CERCLA SI and Expanded SI.



Groundwater contaminants have been detected inside the black line. PCE in groundwater are detected below water quality standards outside the yellow line.



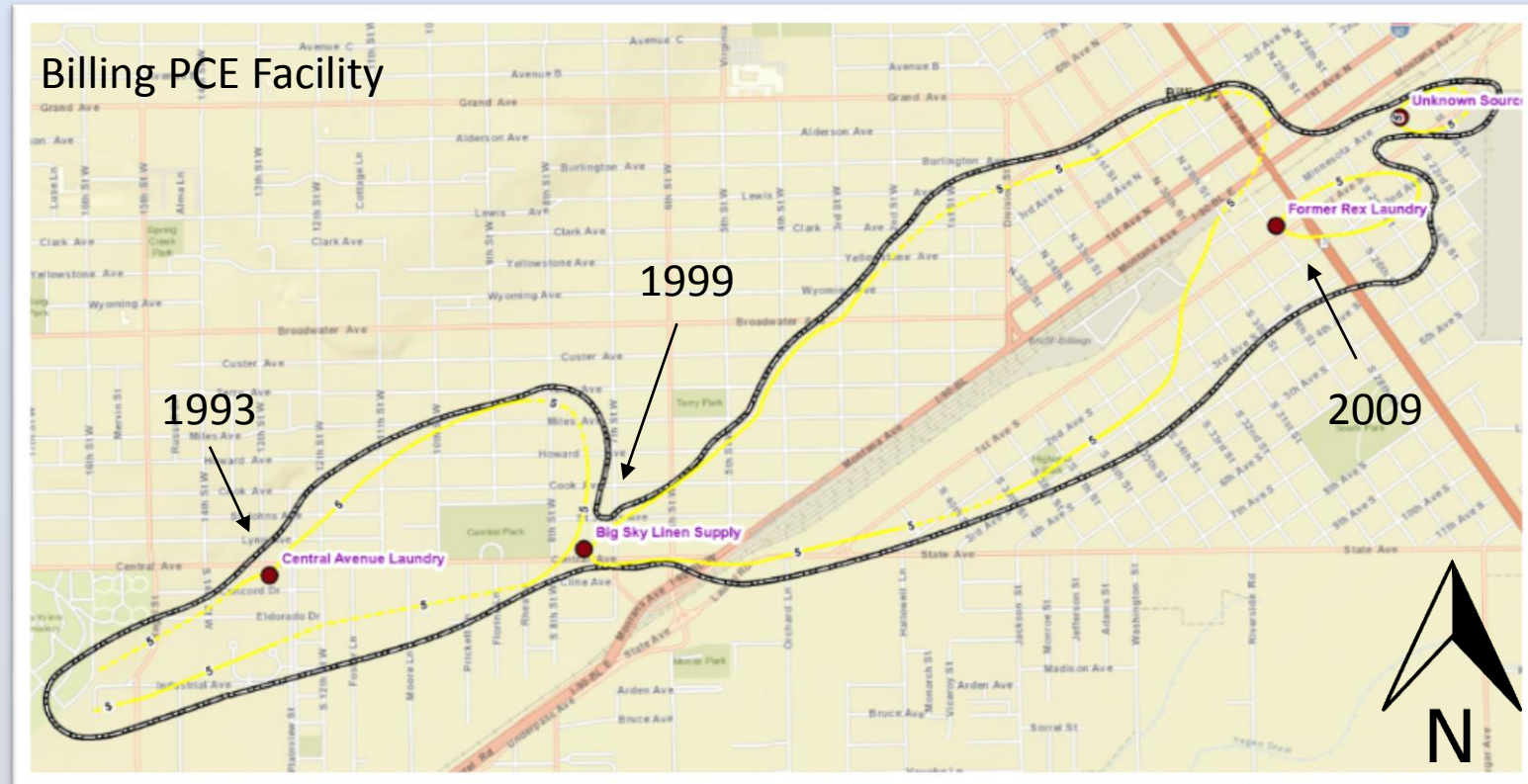
Site Background

EPA Emergency Removal

- ❑ Excavated contaminated soil, built sheet pile wall, injected chemicals to breakdown contamination
- ❑ Installation of mitigation systems at 7 structures
- ❑ EPA continues to monitor



Site Background



Groundwater contaminants have been detected inside the black line. PCE in groundwater are detected below water quality standards outside the yellow line.

Post EPA removal: New data indicated solvent source near Riverstone Health Clinic area.

□ 2016 - 2018: DEQ conducted the remedial investigation.



How does the contamination behave in the environment?

- ☐ Some of them may sink in groundwater some may float on top of groundwater
- ☐ Solvents can “volatilize” or evaporate out of liquid and create a vapor



RI Samples Collected:

- ☐ 87 surface soil (0-2 feet below ground)
- ☐ 178 subsurface soil (greater than 2 feet below ground)
- ☐ 7 co-located surface water & sediment
- ☐ 371 groundwater
- ☐ 145 soil vapor & air

Storm/Surface Water & Sediment Results



Utility Corridor Investigation Results

- ❑ DEQ investigated utility piping conditions in the CAL, Former Rex, and Big Sky Linen source areas.
- ❑ A large hole was found in the sewer that services the Former Rex Cleaners.



Soil Results in Source Areas



- ❑ CAL soil exceeded leaching screening levels. Highest sample was in the alley on the south side (0.042 – 0.17 mg/kg).

Soil Results in Source Areas



- ❑ Former Rex Cleaners soil exceeded leaching screening levels at (0.042 – 0.083 mg/kg). Petroleum compounds exceeded screening levels.

Soil Results in Source Areas



- ❑ Big Sky Linen soil exceeded leaching to groundwater screening levels for PCE (0.037 – 1.01 mg/kg).
- ❑ One sample was detected at 89.7 mg/kg collected at a depth of 16.0 feet below ground. Other petroleum compounds were also detected.

Groundwater Results

PCE	TCE
<i>water quality standard = 5.0 µg/L</i>	<i>water quality standard = 5.0 µg/L</i>
CAL = 191 µg/L	CAL = 4.3 µg/L
Former Rex Laundry = 164 µg/L	Former Rex Laundry = 22 µg/L
Unknown Source Area = 1,790 µg/L	Unknown Source Area = 72 µg/L
Big Sky Linen = 47,400 µg/L	Big Sky Linen = 444 µg/L

❑ PCE and TCE were the only compounds that were found across the entire site.

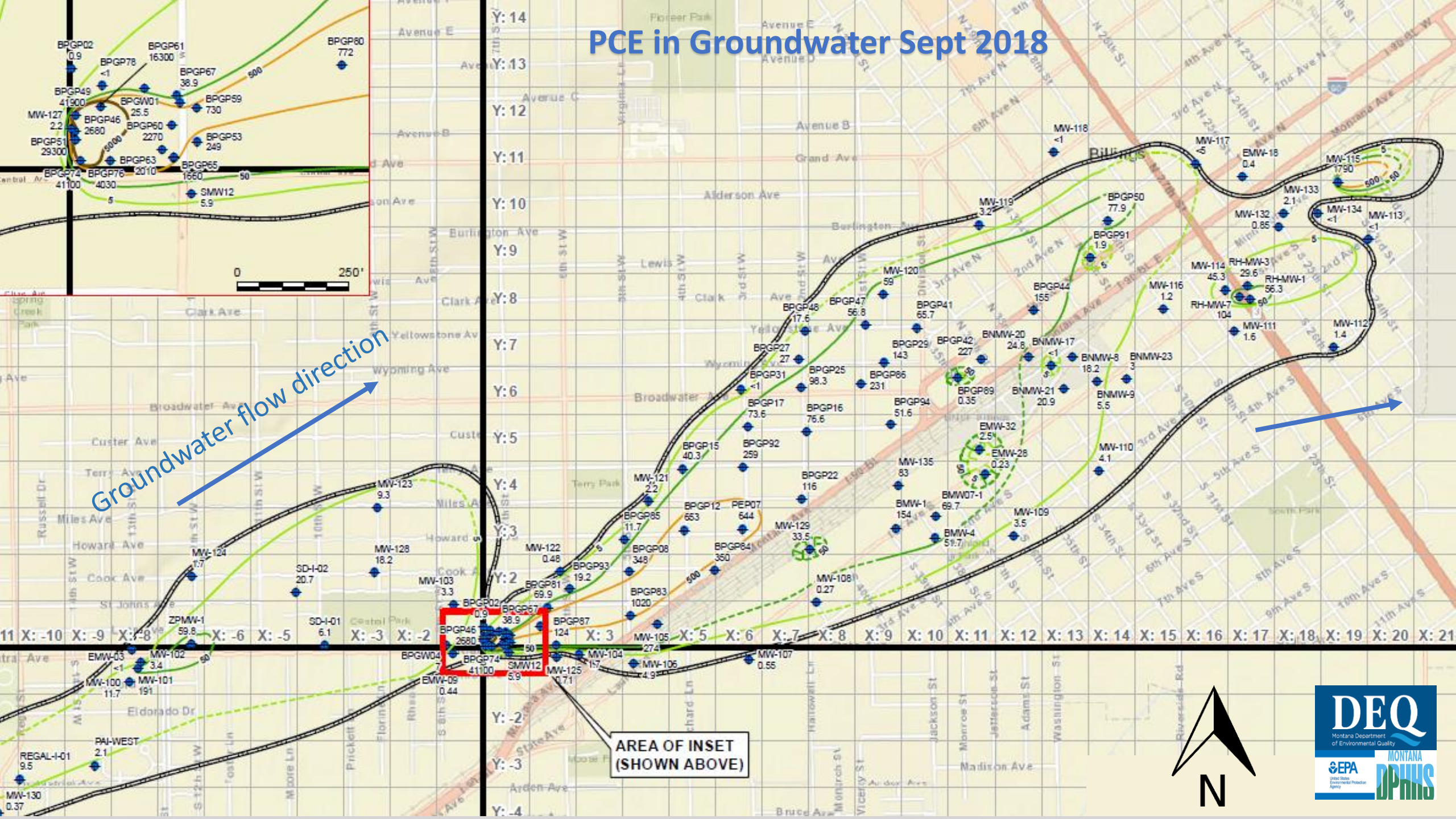
❑ Also:

❑ Petroleum compounds: 1-methylnaphthalene, benzene, C5-C8 aliphatics, C9-C10 aromatic, C9-C12 aliphatics

❑ Metals: cobalt, manganese, and iron

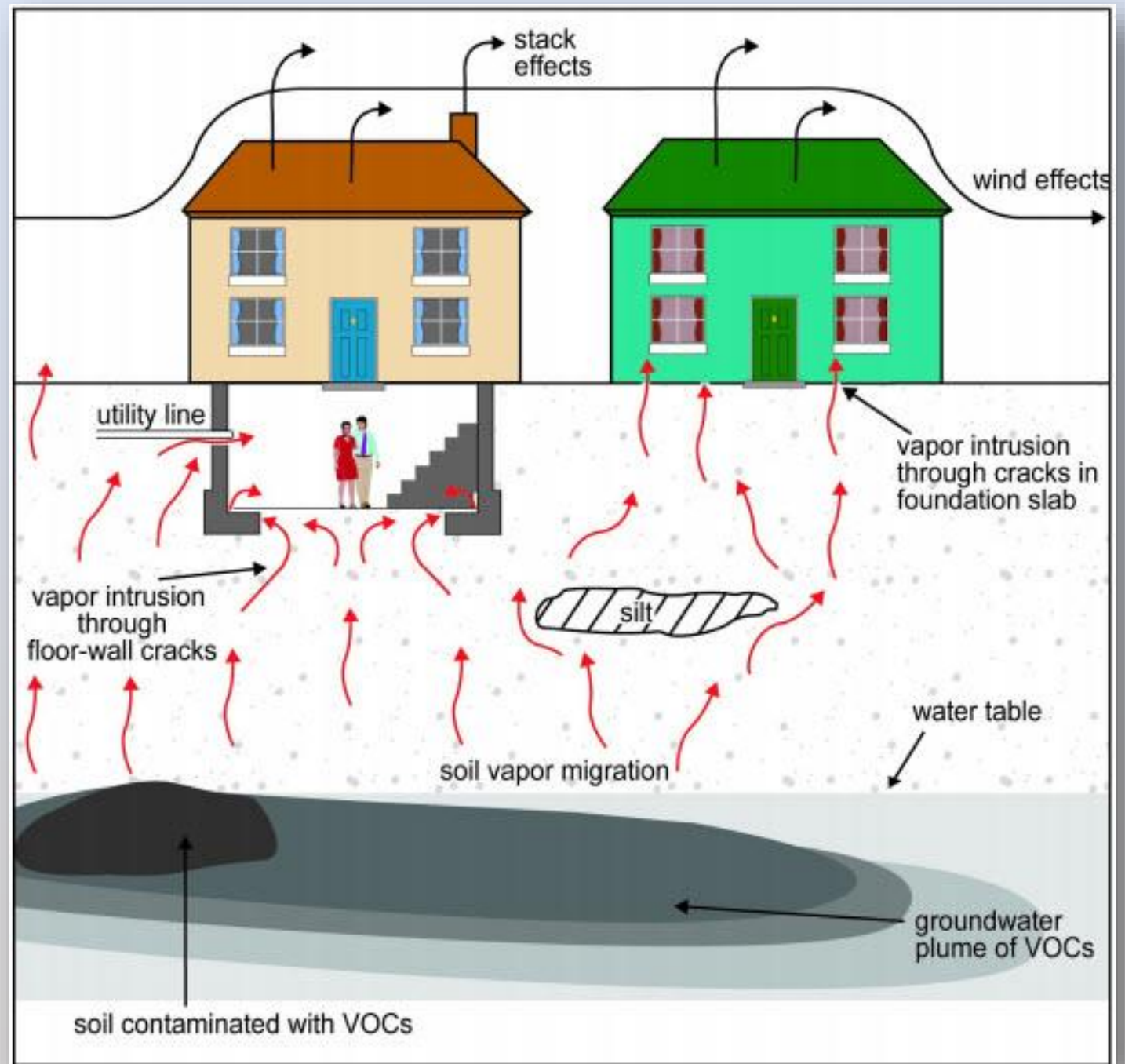


PCE in Groundwater Sept 2018



What is Vapor Intrusion?

- ❑ Contaminant vapors travel through the ground into buildings.



Here is how air sampling is done



Outdoor air



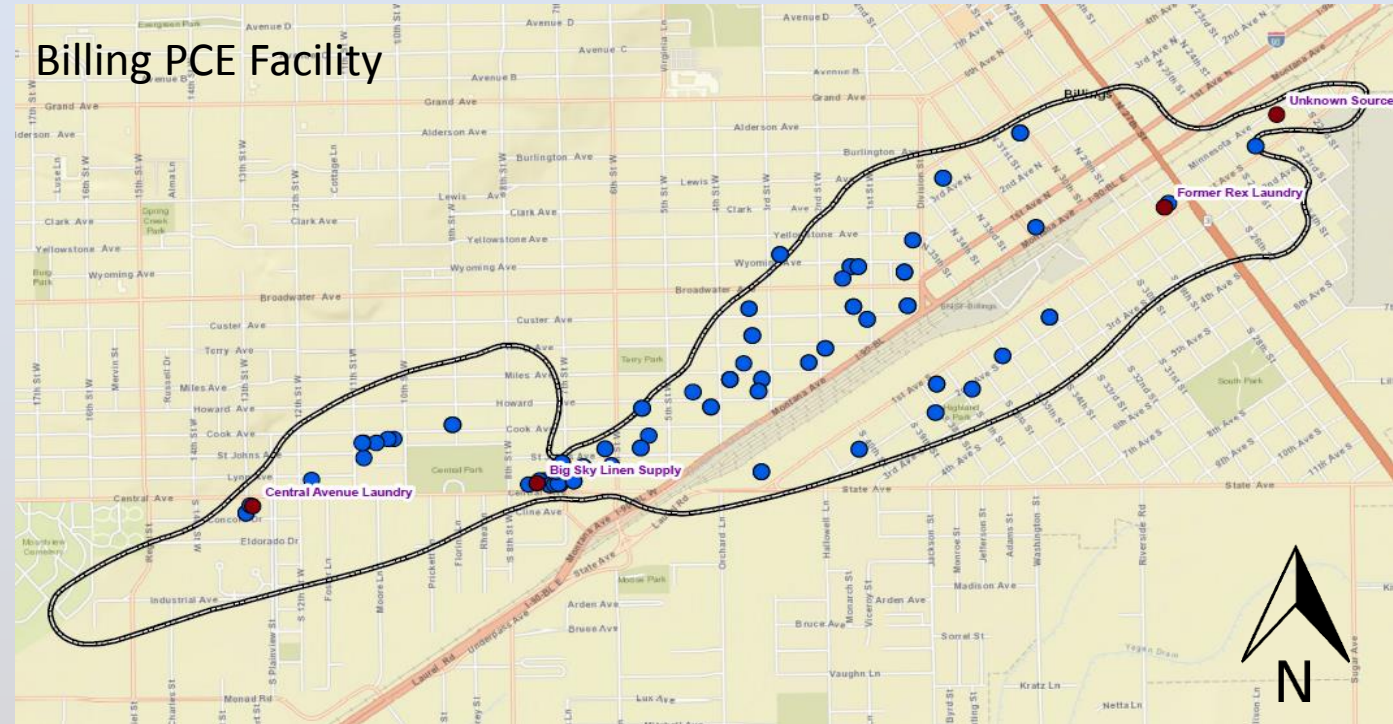
Indoor air



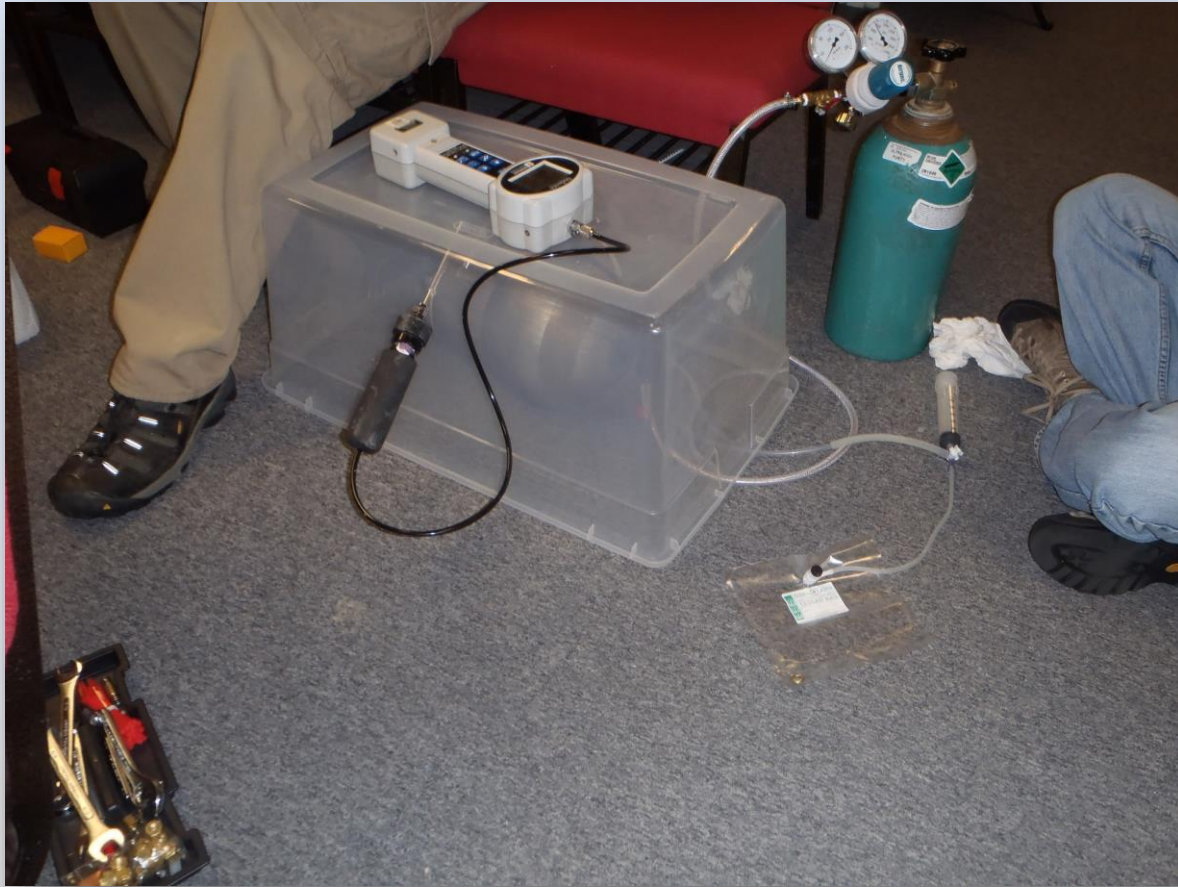
Sub-slab air

Air Results

- ❑ 49 structures sampled
- ❑ Air concentrations higher when groundwater PCE concentrations were greater than 50 µg/L
- ❑ Other compounds also detected
- ❑ 5 of 7 structures with mitigation systems sampled



Potential Risks and Screening Levels



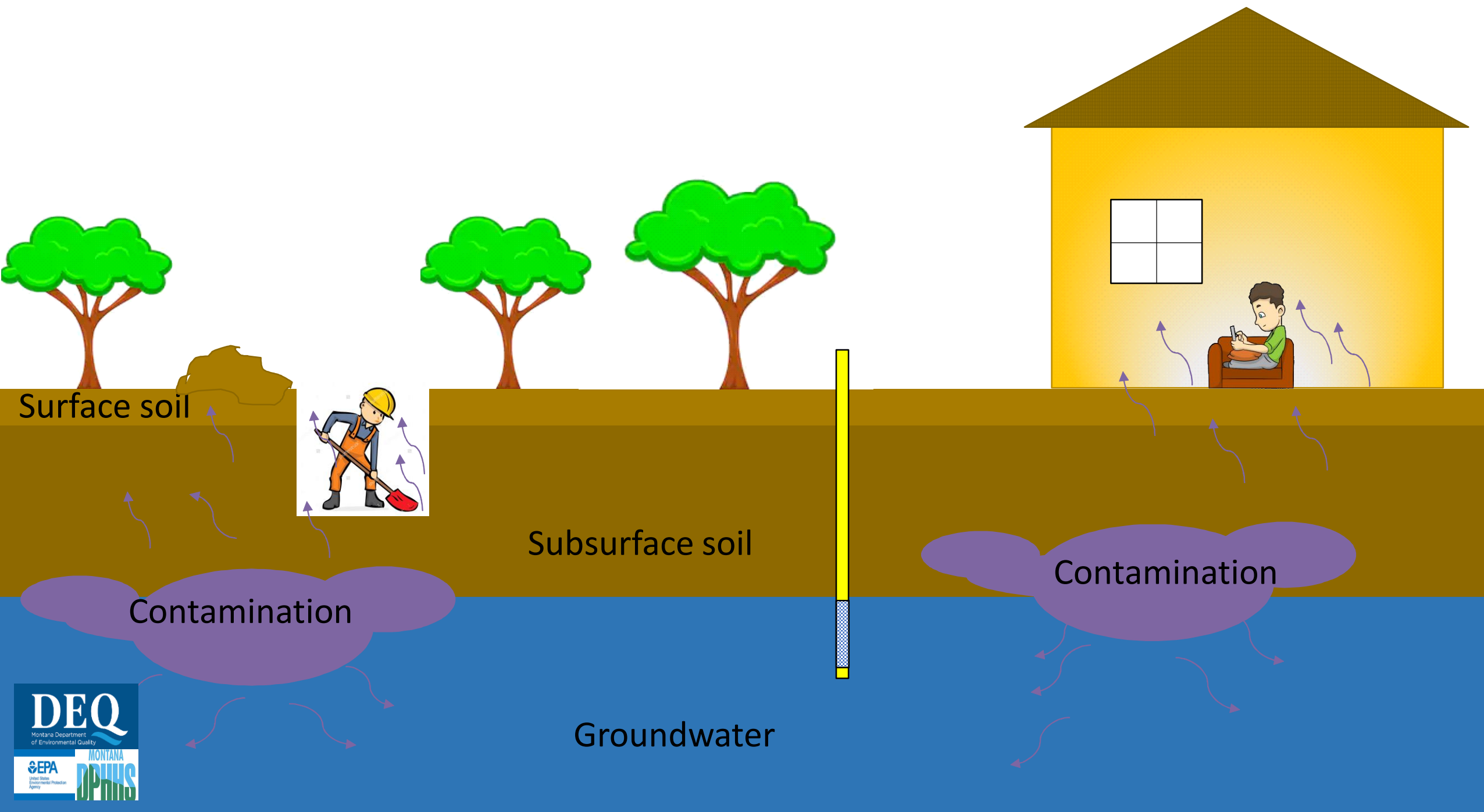
Aimee Reynolds, Contaminated Site Cleanup
Bureau Chief and Risk Assessor

Lots of Data

How do we decide
what we need to do?

Evaluate risks





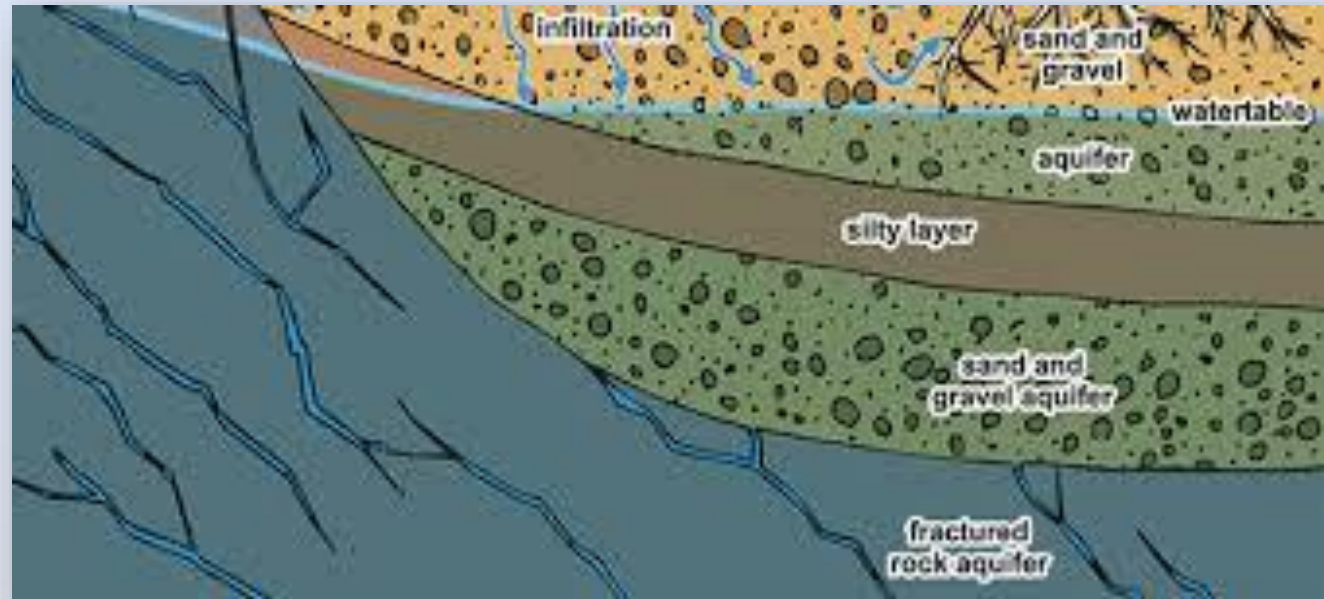
Soil

- Typical exposures:
 - Residential
 - Commercial/Industrial
 - Construction Worker
- Billings PCE Good News:
 - Soil contamination at depth
- Potential Risks:
 - Leaching to groundwater
 - Volatilization to indoor air



Groundwater

- Typical exposures:
 - Residential
 - Commercial/Industrial
 - Construction Worker
- Billings PCE Good News:
 - City water and not in water lines
 - No drinking water wells
 - Cleanup levels – Water Quality Standards
- Potential Risks:
 - Consuming irrigation water
 - Volatilization to indoor air



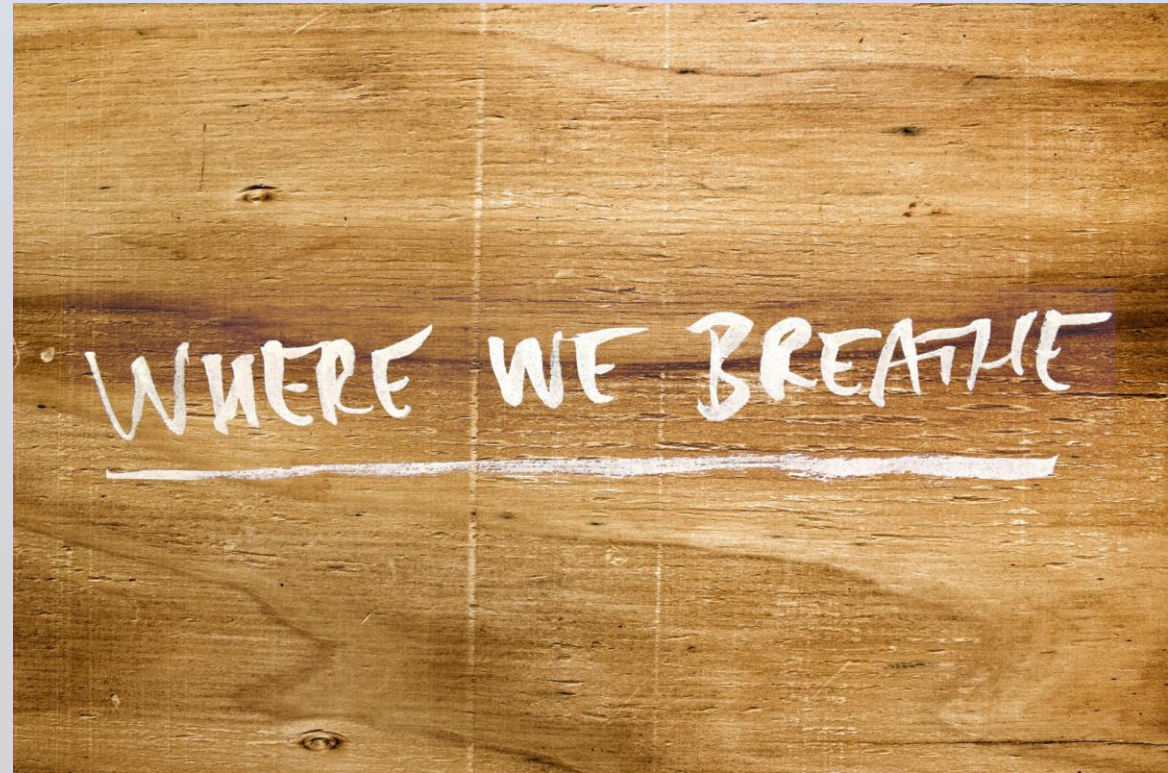
Indoor Air

- Typical exposures:
 - Residential
 - Commercial/Industrial
- Billings PCE Focus
- Potential Risks:
 - Inhalation of vapors



How do we evaluate indoor air?

Human Health Based
Screening Levels



EPA Removal Action

- Focus on PCE above 42 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)
- Address immediate concerns
- Removal and mitigation systems
- Stabilize the situation
- Continued monitoring



Remedial Investigation

- Discovery of other sources
- Discovery of other contaminants
- Generic EPA Regional Screening Levels (RSLs)
- Generic DEQ Screening Levels for Petroleum
- Typical Indoor Air Concentrations
- Eleven potential VI contaminants

Potential VI Contaminants

- Chlorinated Compounds:

- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Bromodichloromethane
- Carbon Tetrachloride
- Chloroform

- Petroleum Compounds:

- Benzene
- C5-C8 Aliphatics
- C9-C12 Aliphatics
- 1,2-Dichloroethane
- 1,2,4-Trimethylbenzene
- 1,3-Butadiene

Site-Specific Screening Levels

- Developed to refine our focus
- Typical indoor air concentrations
- Risk-based but site-specific
- Residential indoor air
- Commercial indoor air
- Given where we are in the process, not the final cleanup levels

Residential Human Health-Based Screening Level Basis

- Protective of residents
 - 24 hours per day
 - 350 days per year
 - 26 years of exposure
 - Averaged over 26 years or a lifetime
- Long-term exposure



Commercial Human Health-Based Screening Level Basis

- Protective of workers
 - 8 hours per day
 - 250 days per year
 - 25 years of exposure
 - Averaged over 25 years or a lifetime
- Long-term exposure



Other Factors

- Current EPA guidance
- Toxicity criteria accepted by EPA
- **Cumulative** potential excess lifetime cancer risk of 1 in 100,000 or 1×10^{-5} AND
- **Cumulative** non-cancer levels that don't cause negative health effects

What does excess lifetime cancer risk mean?



- Excess lifetime cancer risk
 - Humans have about a 1 in 3 chance
 - Being exposed would be an extra 1 in 100,000 chance
 - So if it's 33% for all of us, excess is 33.001%

What about non-cancer effects?

- Studies result in threshold concentrations:
 - expected to have low potential to cause negative health effects
 - or no potential to cause negative effects
- Toxicity criteria are developed using these concentrations
- We use these criteria to develop screening levels

What does “cumulative” mean?

The screening levels must be protective when you add up all the cancer risks and all the non-cancer risks to the same organs for each compound.

$$1 + 2 = 3$$

Potential Toxic Effects – Chlorinated Compounds

- Tetrachloroethene (PCE) – central nervous system effects; also associated with liver cancer
- Trichloroethene (TCE) – developmental effects; also associated with immunological effects and various cancers
- Bromodichloromethane – urinary cancer
- Carbon Tetrachloride – liver and glandular cancers
- Chloroform – liver cancer

Potential Toxic Effects – Petroleum Compounds

- Benzene – leukemia
- C5-C8 Aliphatics – nasal effects
- C9-C12 Aliphatics – nasal effects; also associated with adrenal effects
- 1,2-Dichloroethane – cancer of the spleen and other blood vessels
- 1,2,4-Trimethylbenzene – central nervous system effects
- 1,3-Butadiene – leukemia and other cancers

Current DEQ Site-Specific Screening Levels

Compound	Residential Screening Level	Commercial Screening Level
PCE	15 µg/m ³	66 µg/m ³
TCE	0.7 µg/m ³	4.2 µg/m ³
Benzene	1.3 µg/m ³	2.2 µg/m ³
Bromochloromethane	0.1 µg/m ³	0.5 µg/m ³
1,3-Butadiene	0.1 µg/m ³	0.6 µg/m ³
C5-C8 Aliphatics	313 µg/m ³	1,314 µg/m ³
C9-C12 Aliphatics	52 µg/m ³	219 µg/m ³
Carbon Tetrachloride	0.7 µg/m ³	2.8 µg/m ³
Chloroform	0.2 µg/m ³	0.7 µg/m ³
1,2-Dichloroethane	0.23 µg/m ³	0.7 µg/m ³
1,2,4-Trimethylbenzene	31 µg/m ³	131 µg/m ³

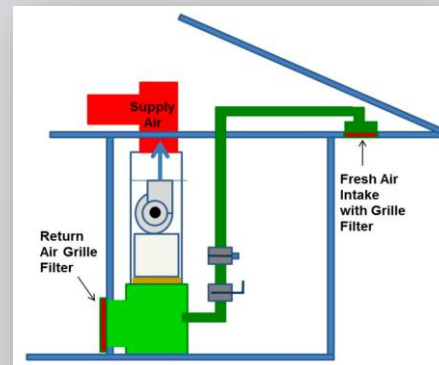
µg/m³ = micrograms per cubic meter

Next Steps

- More investigation needed
- Short term steps to mitigate exposure
- Long term options to address the site

Ways to reduce indoor air concentrations

- ☐ Seal cracks, seams, & penetrations
- ☐ Use vapor barriers
- ☐ Improve ventilation
- ☐ Install sub-slab depressurization system

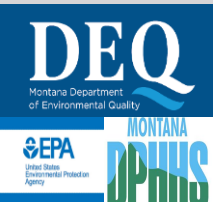


EPA Superfund Program

Victor Ketellapper, PE

Site Assessment Program, Team Leader

USEPA Region 8, Denver, CO



Possible Next Steps

- State and local programs/funding
- Voluntary cleanup actions
- Additional EPA Superfund program removal actions
- Superfund Site Designation (National Priorities List)

EPA National Priority List Sites

- Addresses long-term threats to human health and environment
- Funding to complete further assessment, risk evaluation, and cleanup actions
- Opportunity for local community involvement and input
- Results in a permanent and protective remedy

How are sites placed on the National Priorities List

- EPA documents the eligibility for a site to be considered using the Hazard Ranking System
- State provides a support/concurrence letter
- The EPA proposes to add the site
- Public comment period
- After consideration of public comment, the EPA decides whether or not to add the site to the National Priorities List

The Hazard Ranking System (HRS)

- A screening tool
- Sites can score between 0-100, with scores > 28.5 being eligible for National Priorities List designation.
- HRS scores releases from sources of contamination that could come into contact with people or sensitive environments.
- Identifies sources of contamination to be investigated, not site boundaries

To Wrap Things Up

- ☐ Remedial Investigation results
- ☐ Good news
- ☐ Potential risks and screening levels
- ☐ Possible next steps
- ☐ Answer questions

Questions?



[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)

Contact Information



State Superfund Project Officer: Mike Gipson

Direct Phone Line: (406) 444-6422

Fax: (406)444-6783

Email: mgipson@mt.gov

Billings PCE Site website:

<http://deq.mt.gov/Land/statesuperfund/Billings-PCE>

DEQ website:

<http://deq.mt.gov/Land/statesuperfund>

To sign up for the Billings PCE Electronic List, send an email to: adaniels2@mt.gov



Victor Ketallapper

Direct Phone Line: (303)312-6578

Email: ketallapper.victor@epa.gov

Jennifer Chergo

Direct Phone Line: (303)312-6601

Email: chergo.jennifer@epa.gov



Epidemiologist: Connie Garrett

Direct Phone Line: (406) 444-5954

Email: Connie.Garrett@mt.gov

State Toxicologist: Matthew Ferguson

Direct Phone Line: (406) 444-3284

Email: matthew.ferguson@mt.gov